PROMISE®
TECHNOLOGY, INC.

VessJBOD
1740, 1840
Product Manual

Version 1.0

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This version of the *Product Manual* supersedes all previous versions.

Recommendations

In this *Product Manual*, the appearance of products made by other companies, including but not limited to software, servers, and disk drives, is for the purpose of illustration and explanation only. Promise Technology does not recommend, endorse, prefer, or support any product made by another manufacturer.

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Chapter 1: Introduction to VessJBOD

This chapter covers the following topics:

- About This Manual (below)
- VessJBOD Overview (page 2)
- Architectural Description (page 2)
- Features (page 3)
- Specifications (page 3)

About This Manual

This *Product Manual* describes how to setup, use, and maintain the VessJBOD 1740 and 1840 external disk array subsystems. It also describes how to use the built-in command-line interface (CLI).

This manual includes a full table of contents, index, chapter task lists, and numerous cross-references to help you find the specific information you are looking for.

Also included are four levels of notices:

Note

A *Note* provides helpful information such as hints or alternative ways of doing a task.

Important

An *Important* calls attention to an essential step or point required to complete a task. Important items include things often missed.

Caution

A *Caution* informs you of possible equipment damage or loss of data and how to avoid them.

Warning

A *Warning* notifies you of probable equipment damage or loss of data, or the possibility of physical injury, and how to avoid them.

VessJBOD Overview

Figure 1. VessJBOD front view

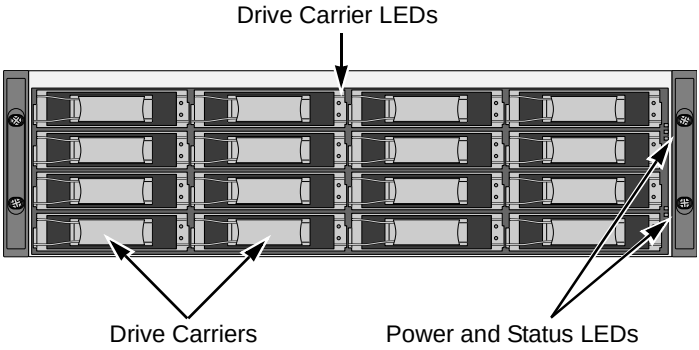


Figure 2. VessJBOD 1740 rear view

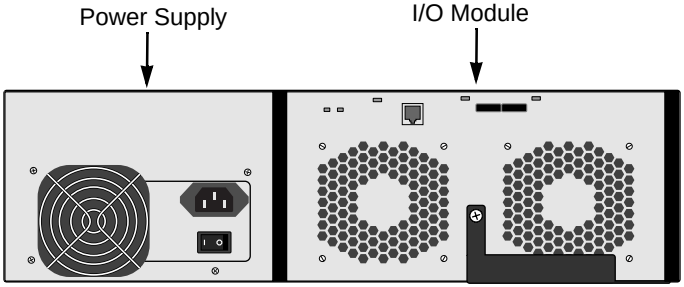
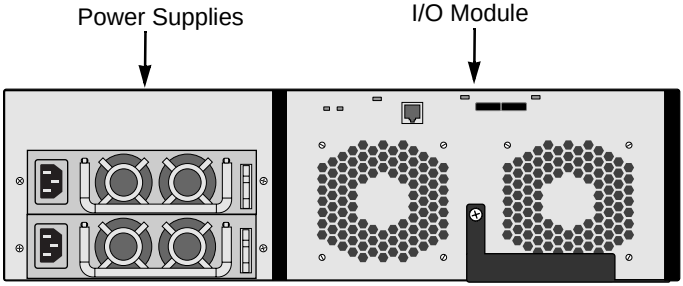


Figure 3. VessJBOD 1840 rear view



Architectural Description

The VessJBOD 1740 and 1840 are Serial Attached SCSI (SAS) subsystems designed for JBOD expansion to a SAS-capable host system.

The VessJBOD subsystems support:

- 3.0 Gb/s SATA disk drives
- 3.0 Gb/s SAS disk drives

All VessJBOD enclosures include a mid-plane, power supply unit, and enclosure processor all in one cable-less chassis design. Multiple fans and optional power supplies provide redundancy to ensure continued usage during component failure.

Features

- RJ11 serial port supports RS232 protocol via adapter cable.
- 16 hot-swappable drive bays in a robust 3U rackmount chassis.
- Redundant, hot-swappable power supplies on 1840 model.
- Drive Support: Up to 16 3.5" x 1" SAS or SATA 3 Gb/s hard disk drives.
- Supports any combination of SAS and SATA drives in the system.
- Staggered physical drive spin-up.
- Command Line Interface via RJ-11 Serial Port.
- Three years complete system limited warranty includes 24 x 7 email and phone support with highly experienced technical support technicians and an advanced replacements program.
- Compatible with leading SAS hard drives, host bus adapters, and RAID controllers.

Specifications

Power Supply:

1740, Single, 100-240 VAC auto-ranging, 50-60 Hz, with PFC and 80PLUS certification

1840, Dual hot-swappable and redundant, 100-240 VAC auto-ranging, 50-60 Hz, with PFC

Current (maximum): 8 A @ 100 VAC or 4 A @ 240 VAC Current rating with two power cords.

Power Consumption:

Without disk drives, 34.75 W

With disk drives, 235.0 W

Temperature: 5° to 40°C operational (-40° to 60°C non-operational)

Relative Humidity: Maximum 95 percent.

Vibration: Random, 0.21 grms, 5-500 Hz, 30 Mins, X, Y, Z axis.

Dimensions (H x W x D): 13 x 45 x 46 cm (5.1 x 17.7 x 18.1 in)

Net Weight:

1740, 13.8 kg (30.4 lb) without drives, 21.8 kg (48.1 lb) with 16 drives*

1840, 15.8 kg (34.8 lb) without drives, 23.8 kg (52.5 lb) with 16 drives*

* Assuming 0.5 kg (1.1 lb) per drive.

Gross Weight (including carton):

1740, 19.2 kg (42.3 lb) without drives.

1840, 20.8 kg (45.9 lb) without drives.

Safety: BSMI, CB, CCC, CE, FCC Class B, MIC, VCCI, UL, cUL, TUV.

Environmental: RoHS, China RoHS.

Warranty and Support

Warranty: Three year limited warranty on all components.

Support: 24x7 email and phone support (English only). 24x7 access to Promise support site for drivers, firmware, and compatibility.

CE Statement

Warning: This is a class B product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

KCC Statement

A급 기기 (업무용 정보통신기기)

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약 잘못판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

Chapter 2: VessJBOD Installation

This chapter covers the following topics:

- Unpacking the VessJBOD (below)
- Mounting VessJBOD in a Rack (page 7)
- Installing Disk Drives (page 9)
- Making Data and Management Connections (page 11)
- Setting Up Serial Cable Connections (page 15)
- Connecting the Power (page 16)
- Setting up the Serial Connection (page 18)

Unpacking the VessJBOD

The VessJBOD box contains the following items:

- VessJBOD Unit
- *Quick Start Guide* printed
- RJ11-to-DB9 serial data cable
- Screws for disk drives (70, including 6 spares)
- 1.5m (4.9 ft) Power cords (1740, 1; 1840, 2)
- CD with *Product Manual* and *Quick Start Guide* in PDF format

Warning

The electronic components within the VessJBOD enclosure are sensitive to damage from Electro-Static Discharge (ESD). Observe appropriate precautions at all times when handling the VessJBOD or its subassemblies.

Figure 1. VessJBOD front view

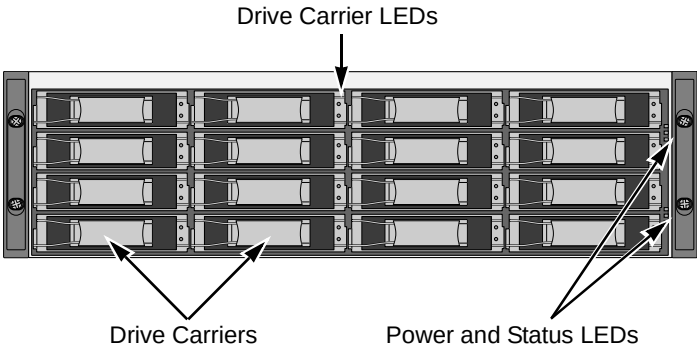


Figure 1. VessJBOD 1740 rear view

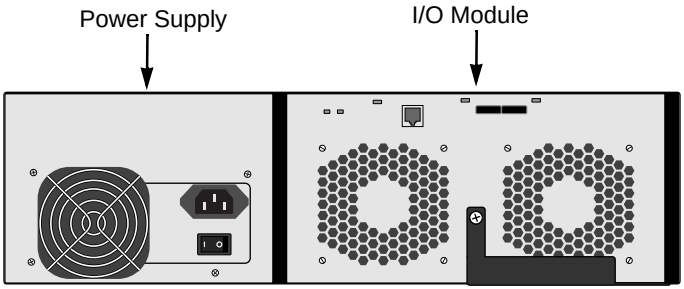
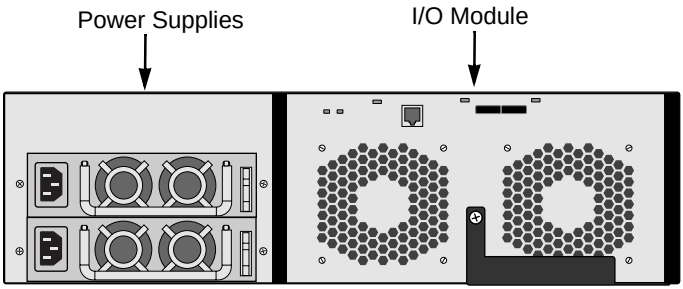


Figure 2. VessJBOD 1840 rear view

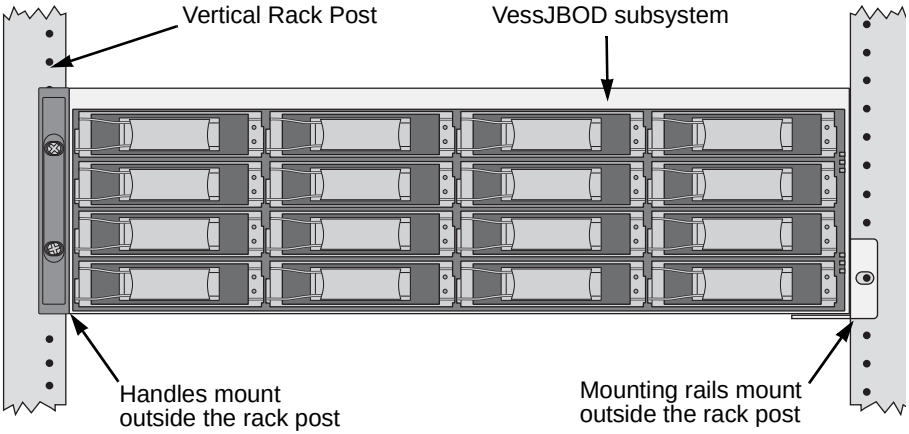


For a description of the LEDs, see pages 16 and 17.

Mounting VessJBOD in a Rack

The VessJBOD subsystem installs to the rack using the available mounting rails. You can also use your existing rails.

Figure 3. VessJBOD mounted in a rack with the available rails



Cautions

- At least two persons are required to safely lift, place, and attach the VessJBOD subsystem into a rack system.
- Do not lift or move the VessJBOD subsystem by the handles, power supply or the I/O module. Hold the subsystem itself.
- Only a qualified electrician who is familiar with the installation procedure should mount and install the VessJBOD subsystem.
- Be sure all switches are OFF before installing the VessJBOD subsystem or exchanging components.

To install the VessJBOD subsystem into a rack with the available mounting rails:

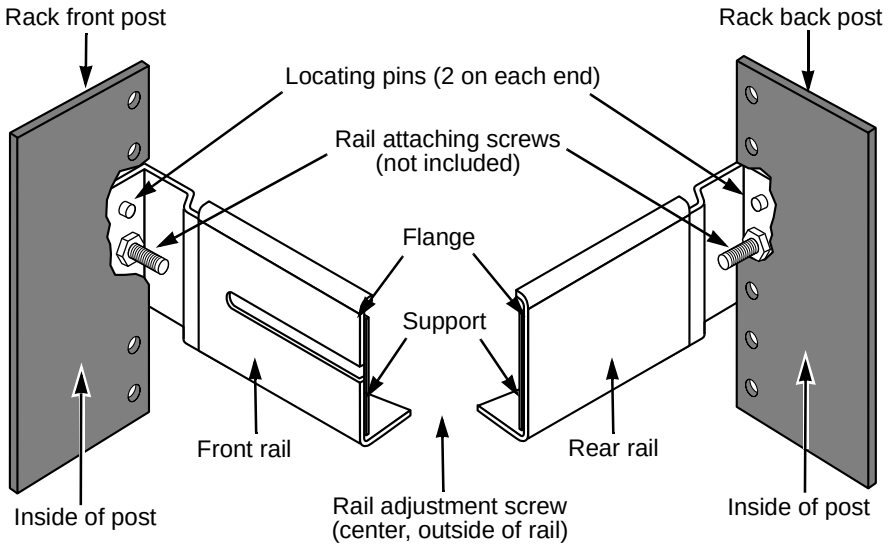
1. Check the fit of the mounting rails in your rack system.
2. Adjust the length of the mounting rails as needed.

3. Attach the mounting rail assemblies to the outside of the rack posts, using the attaching screws from your rack system.

   Be sure the support is on the bottom facing inward.

4. Square the rail assemblies in the rack.
5. Tighten the adjustment screws and the attaching screws.
6. Place the VessJBOD subsystem onto the rails.
7. Secure the VessJBOD subsystem to the rack through each handle, using the attaching screws from your rack system.

Figure 4. Rack mount assembly diagram



This completes rack mounting. Go to “Installing Disk Drives” on page 9.

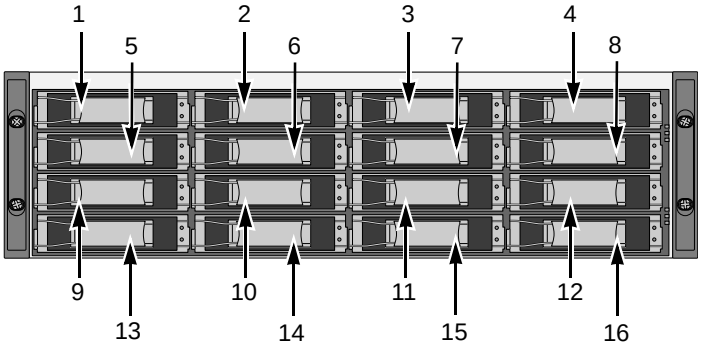
Installing Disk Drives

You can populate the VessJBOD with SAS or SATA hard disk drives. For optimal performance, install physical drives of the same model and capacity.

Drive Slot Numbering

You can install any suitable disk drive into any slot in the enclosure. The diagram below shows how VessJBOD's drive slots are numbered.

Figure 5. VessJBOD drive slot numbering



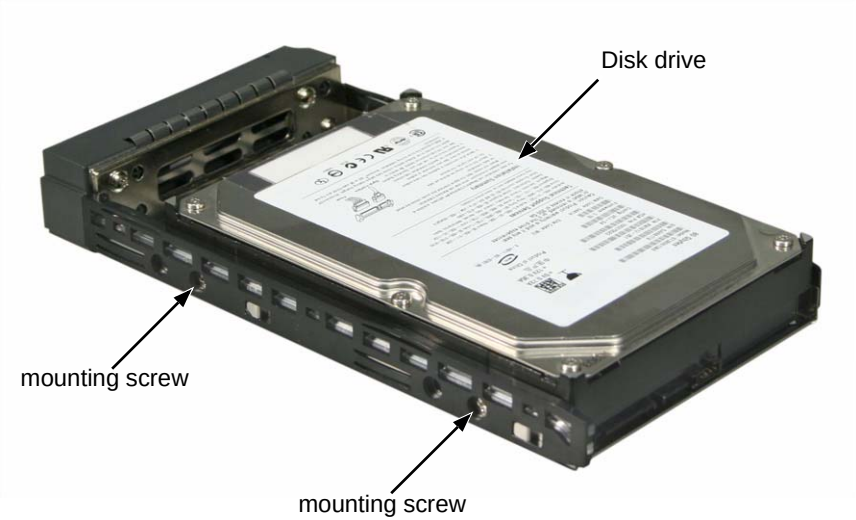
Install all of the drive carriers into the VessJBOD enclosure to ensure proper airflow, even if you do not populate all the carriers with disk drives.

Installing Your Disk Drives

1. Remove a disk drive carrier.
2. Carefully lay the disk drive into the drive carrier at the front, so that the screw holes on the sides line up.
3. Insert the screws through the holes in the drive carrier and into the sides of the disk drive.
    - Install only the counter-sink screws supplied with the VessJBOD.
    - Install four screws per drive.
    - Snug each screw. Be careful not to over-tighten.
4. Reinstall the drive carrier into the VessJBOD chassis.

Repeat steps 1 through 3 until all of your disk drives are installed.

Figure 6. Disk drive mounted in a drive carrier



This completes disk drive installation. Go to “Making Data and Management Connections” on page 11.

Caution

VessJBOD supports disk drive hot-swapping. To avoid hand contact with an electrical hazard, do not remove more than one drive carrier a time.

Making Data and Management Connections

You can configure your VessJBOD as:

- JBOD Expansion to a VessRAID subsystem
- Drive enclosures for a SuperTrak RAID controller

JBOD Expansion to a VessRAID Subsystem

Configuring a Data Path

To establish the data path:

1. Connect the SAS HBA card in the Host PC to the SAS IN ports (with a circle icon) on the VessRAID controller. See page 12, Figure 7.
2. Connect the SAS Expansion port (with a diamond icon) of the VessRAID controller to the SAS IN port (with a circle icon) on the I/O module of the first VessJBOD.
3. Connect the SAS OUT port (with a diamond icon) of the VessJBOD I/O module of the first VessJBOD to the SAS IN port (with a circle icon) on the I/O module of the second VessJBOD.
4. Connect the remaining VessJBOD units in the same manner.

   Be sure to connect circle icon to diamond icon and vice versa.

   All SAS ports have SFF-8088 connectors.

Configuring a Management Path

VessRAID subsystems have one RAID controller. The controller has an Ethernet (RJ45) Management Port connector that enables you to monitor the VessJBOD subsystems over your network using the WebPAM PROe software.

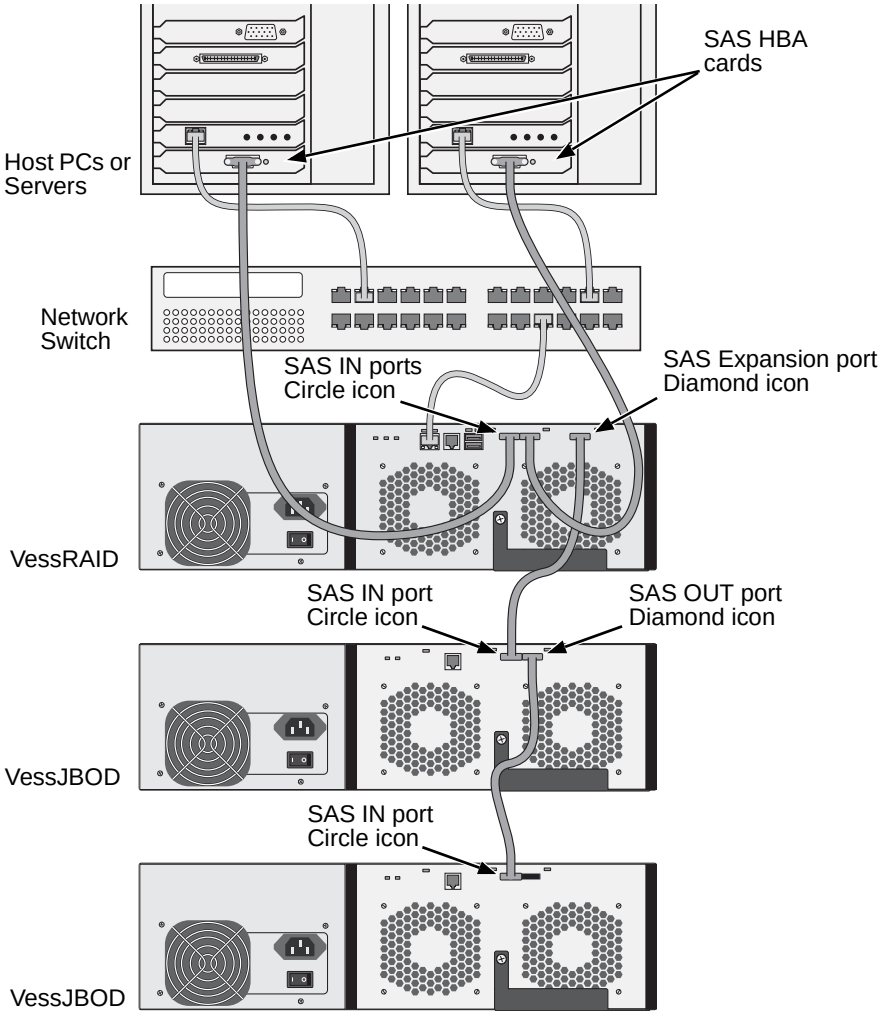
To establish the management path:

1. Connect the Management port on each VessRAID controller to your network switch. See Figure 7.
2. Connect the Host PC's or Server's NIC to your network switch.

Direct Management of VessJBOD

A management connection directly to the VessJBOD uses a serial connection to the Host PC. See pages 15 and 18 for more information.

Figure 7. Data and management connections with VessRAID



Caution

Make data connections carefully. If you accidently switch a SAS IN connection with a SAS OUT, the RAID system cannot function.

This completes data and management connections. Go to “Setting Up Serial Cable Connections” on page 15.

Drive Enclosures for a SuperTrak RAID Controller

Configuring a Data Path

To establish the data path:

1. Connect the SuperTrak RAID Controller in the Host PC to the SAS IN port (with a circle icon) on the I/O module of the first VessJBOD. See page 14, Figure 8.
2. Connect the SAS OUT port (with a diamond icon) of the I/O module of the first VessJBOD to the SAS IN port (with a circle icon) on the I/O module of the second VessJBOD.
3. Connect the remaining VessJBOD units in the same manner.

   Be sure to connect circle icon to diamond icon and vice versa.

   All SAS ports have SFF-8088 connectors.

Configuring a Management Path

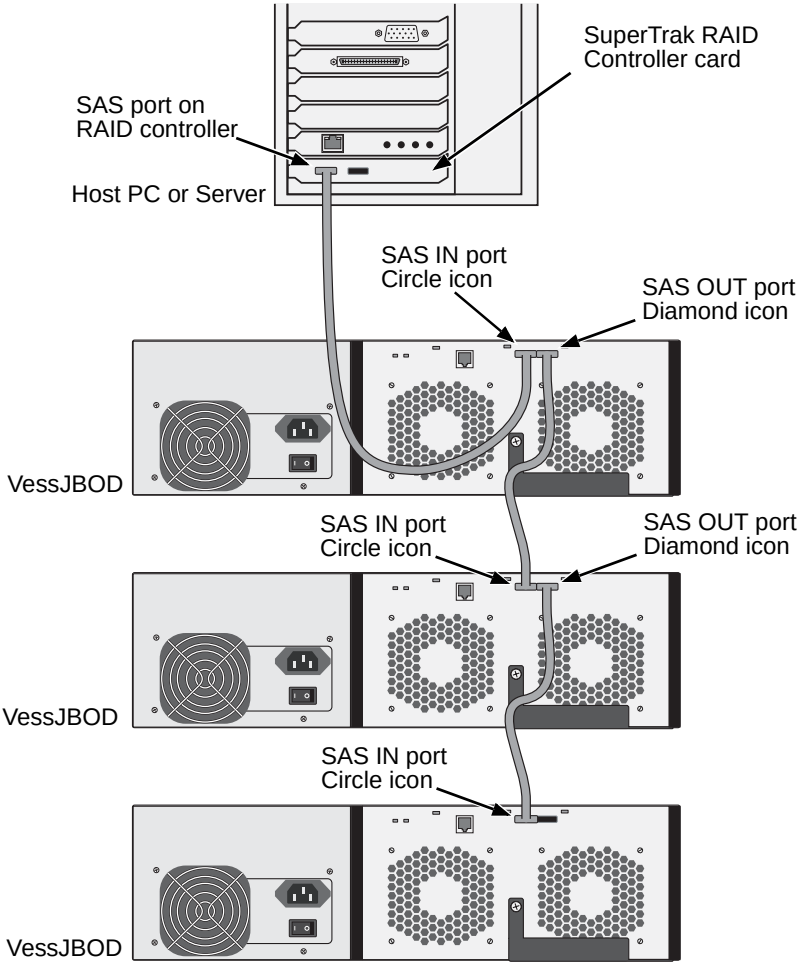
The SuperTrak RAID Controller installs in the Host PC, therefore it does not require a separate network management connection.

You can monitor the VessJBOD subsystems using the WebPAM PRO software installed on the Host PC.

Direct Management of VessJBOD

A management connection directly to the VessJBOD uses a serial connection to the Host PC. See pages 15 and 18 for more information.

Figure 8. Data connections with SuperTrak



Caution

Make data connections carefully. If you accidently switch a SAS IN connection with a SAS OUT, the RAID system cannot function.

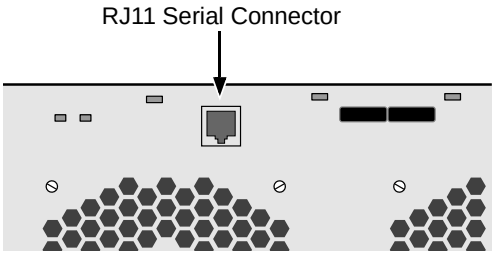
This completes data and management connections. Go to “Setting Up Serial Cable Connections” on page 15.

Setting Up Serial Cable Connections

Serial communication enables the Command Line Interface (CLI) on your PC to monitor and control the VessJBOD. The VessJBOD package includes a RJ11-to-DB9 serial data cable.

The CLI is explained in “Chapter 3: Management” on page 19.

Figure 9. A serial connector is located on the controller



To set up a serial cable connection:

1. Attach the RJ11 end of the serial data cable to the RJ11 serial connector on the controller.
2. Attach the DB9 end of the serial data cable to a serial port on the Host PC or Server.

This completes the serial cable connection. Go to “Connecting the Power” on page 16.

Connecting the Power

Plug-in the power cord on the power supply on the back of the VessJBOD enclosure and switch on the power supply. If you have a VessJBOD 1840, plug-in and turn on both power supplies.

When the power is switched on, the LEDs light up.

Caution

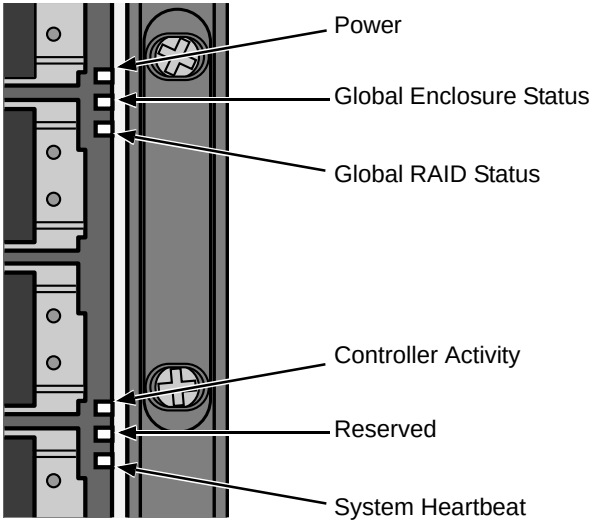
After you turn the power supply switches off, you must wait at least 10 seconds before you turn the power switches on again.

Front Panel LEDs

When boot-up is finished and the VessJBOD subsystem is functioning normally:

- Power, Global Enclosure Status, and Global RAID Status LEDs display green continuously.
- Controller Activity LED flashes green when there is controller activity.
- System Heartbeat LED blinks green once per second.

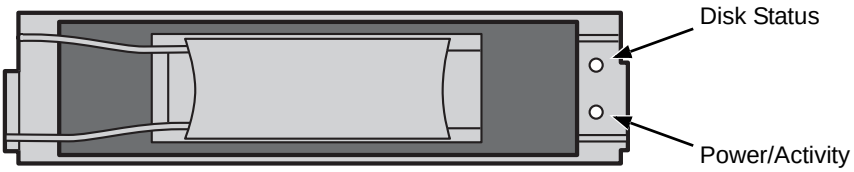
Figure 10. VessJBOD front panel LED display



Disk Drive LEDs

There are two LEDs on each Drive Carrier. They report the presence of a disk drive, activity of the drive, and the drive's current condition.

Figure 11. VessJBOD disk drive carrier LEDs



If there is a disk drive in the carrier, the Power/Activity LED displays green. If not, the Power/Activity LED remains dark. The Power/Activity LED flashes during drive activity.

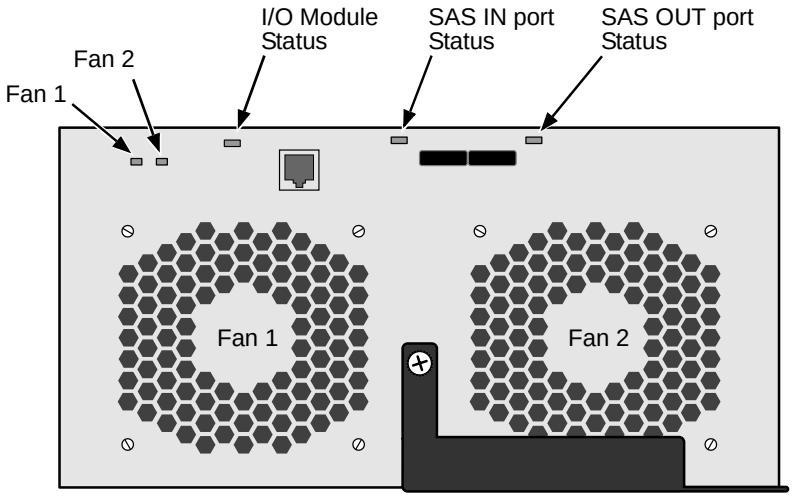
The RAID subsystem controls the Disk Status LED behavior. With a VessRAID, the LED displays green when a drive is configured.

I/O Module LEDs

When boot-up is finished and the VessJBOD subsystem is functioning normally:

- Fan LEDs display green continuously.
- The I/O Module LED displays green, and flashes green for activity.
- SAS port LEDs flash green when there is activity.

Figure 12. VessJBOD I/O Module LEDs



Setting up the Serial Connection

VessJBOD has a Command Line Interface (CLI) to manage all of its functions via your PC's terminal emulation program, such as Microsoft HyperTerminal. This procedure uses the serial cable connection you made on page 15.

You must use the serial connection to run the CLI for direct management of the VessJBOD unit. See "Chapter 3: Management" on page 19.

To set up a serial connection:

1. Change your terminal emulation program settings to match the following specifications:
   - Bits per second: 115200
   - Data bits: 8
   - Parity: None
   - Stop bits: 1
   - Flow control: none
2. Start your PC's terminal VT100 or ANSI emulation program.
3. Press Enter once to launch the CLI.

   When connected and ready, the CLI screen displays:

```
**********************************************
    Promise SAS Expander v2.00.0000.xx
**********************************************

cli>
```

   The **cli>** prompt on your screen indicates that you have a connection and the CLI is ready to accept commands.

Chapter 3: Management

This chapter covers the following topics:

- Front Panel LEDs (below)
- Disk Drive LEDs (page 20)
- I/O Module LEDs (page 21)
- CLI Command Set (page 22)

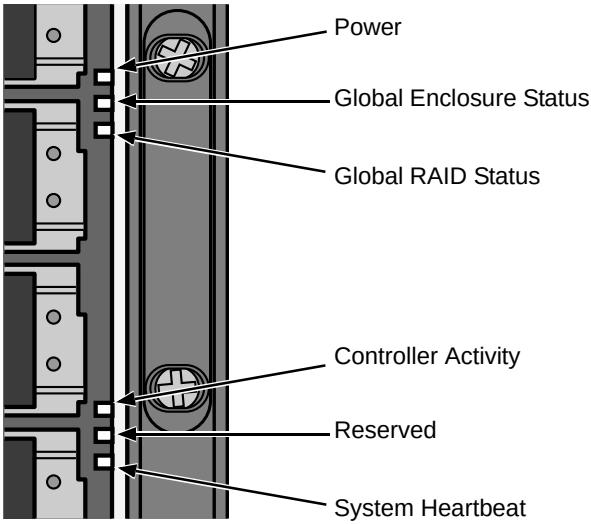
Front Panel LEDs

Even though the Command Line Interface (CLI) offers monitoring of VessJBOD, the LED indicators on the front of the VessJBOD unit provide important status information.

When boot-up is finished and the VessJBOD subsystem is functioning normally:

- Power, Global Enclosure Status, and Global RAID Status LEDs display green continuously.
- Controller Activity LED flashes green when there is controller activity.
- System Heartbeat LED blinks green once per second.

Figure 1. VessJBOD front panel LED display



See the table below.

LEDs	State				
	Dark	**Steady Green**	**Flashing Green**	**Amber**	**Red**
Power	System Off	Normal	—	—	—
Global RAID Status	System Off	Normal	—	Logical Drive Critical	Logical Drive Offline
Global Enclosure Status	System Off	Normal	Locating the Enclosure	Fan, power supply, temperature, or voltage problem*	
Controller Activity	System Off or no SAS ports connected	One or more SAS ports connected	Activity	—	—
Controller Heartbeat	System Off	—	Normal**	—	—

* Check the LEDs on the back of the enclosure for more information.

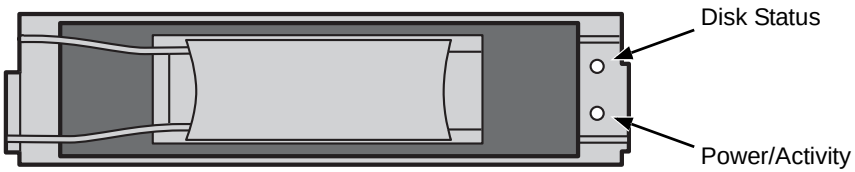
** Blinks green once per second.

When the Global Enclosure LED on VessJBOD's front panel shows Amber or Red, check the LEDs on the back of VessJBOD. These LEDs give the status of individual components.

Disk Drive LEDs

There are two LEDs on each Drive Carrier. They report the presence of a disk drive, activity of the drive, and the drive's current condition.

Figure 2. VessJBOD disk drive carrier LEDs



If there is a disk drive in the carrier, the Power/Activity LED displays green. If not, the Power/Activity LED remains dark.

The Power/Activity LED flashes during drive activity.

The RAID subsystem controls the Disk Status LED behavior. With a VessRAID, the Disk Status LED displays green when a drive is configured.

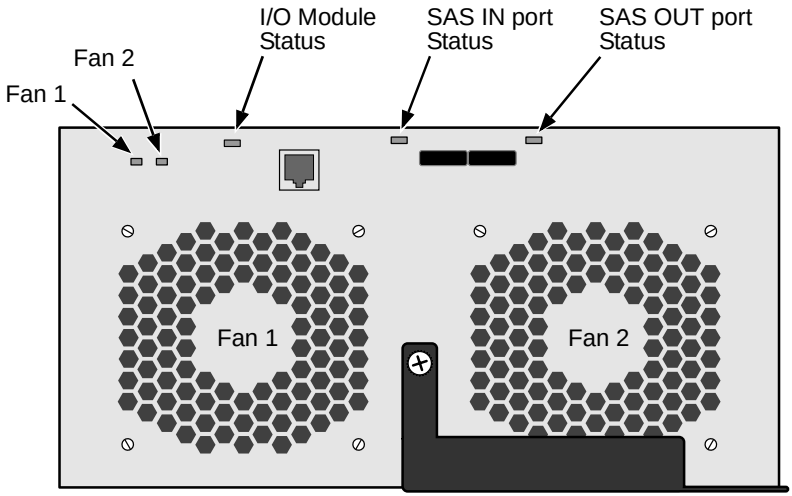
LEDs	State				
	Dark	**Steady Green**	**Flashing Green**	**Amber**	**Red**
Power/ Activity	No Drive	Drive Present	Activity	—	—
Status*	No Drive or Unconfigured	Drive OK	Locating the Drive	Drive Rebuilding	Array Drive Offline
* The RAID subsystem controls Disk Status LED behavior. The pattern described here is from a VessRAID.					

I/O Module LEDs

When boot-up is finished and the VessJBOD subsystem is functioning normally:

- Fan LEDs display green continuously.
- The I/O Module LED displays green, and flashes green for activity.
- SAS port LEDs flash green when there is activity.

Figure 3. VessJBOD I/O Module LEDs



See the table below.

LEDs	State				
	Dark	Green	Amber	Red	Blinking
Fan	Not detected	OK	One fan turning too slowly	Multiple fans turning too slowly	—
I/O Module	No power	OK	Error	—	—
SAS IN/ OUT Ports	No connection	Port connected	—	—	Green: Activity

CLI Command Set

The CLI uses the following set of commands:

cable – Specifies the length of cable for optimal signal quality. See page 22.

enclosure – Displays full information on the VessJBOD enclosure and its components. See page 23.

factorydefault – Restores factory default settings. See page 26.

help – Use alone to see the list of commands. Use with a command to see a list of options. Examples: **enclosure -help** or **enclosure -h**. See page 27.

link – Displays the current status of the PHYs (links), error counter, expander and attached SAS addresses. See page 27.

route – Displays addresses of components through a downstream (expansion) connection. See page 31.

uptime – Displays the number of days, hours, minutes and seconds since the firmware was loaded (since the VessJBOD was started or restarted). See page 32.

vpdr – Displays vital product data on field replaceable units. See page 33.

? – Use alone to see the list of commands. Use with a command to see a list of options. Example: **enclosure -?** See page 33.

Note

Command options are NOT case-sensitive.

Cable Command

The Cable command displays the current cable length settings for the two SAS ports. The I/O module supports cables from 1 to 8 meters in length.

CN#1 is the SAS IN port, circle icon. CN#2 is the SAS OUT port, diamond icon. See page 21, Figure 3.

To view the current settings:

At the cli> prompt, type **cable** and press Enter.

The system returns:

```
CN#1 Cable Length = 1 meter
CN#2 Cable Length = 1 meter
```

To set Expansion connector CN2 for a 3-meter cable:

At the cli> prompt, type **cable -a mod -s “cn2=3”** and press Enter.

The system returns:

```
Cable length of connector 2 is set to 3 meter
```

Enclosure Command

The Enclosure command:

- Enables you to reboot the VessJBOD enclosure (below)
- Displays information about the VessJBOD enclosure (page 24)
- Enables you to make enclosure settings (page 25)

Reboot the Controller

Caution

A controller reboot does NOT meet the system restart requirements for a firmware upgrade.

You can reboot just the controller (I/O module). This action might be needed to help with setting changes on the VessJBOD.

To reboot the controller:

1. Verify that no data I/O activity is in progress.
2. At the cli> prompt, type **enclosure -a mod -s “reboot=1”** and press Enter.

When the cli> prompt reappears, the controller has rebooted.

Note

To reboot the VessJBOD enclosure:

1. Verify that no data I/O activity is in progress.
2. Turn the power supply switch (switches) OFF.
3. Wait 10 seconds. Turn the power supply switch (switches) ON.

Viewing Information

To view enclosure information:

At the cli> prompt, type **enclosure** and press Enter.

The system returns:

```
------------------------------------------------------------
Time since system powerup: 1 day 9 hours 46 minutes 36 seconds
Enclosure           : SAS JBOD 3U-16 Bay
Serial Number       : Cx20j-12345
I/O Module ID       : 1             Max I/O Module Cnt     : 1
Firmware Version    : 02.00.0000.xx  I/O Module Role       : Primary
Max HDD Slots       : 16            Max Connectors         : 2
Max PSU Cnt         : 2             Max Fan Cnt            : 2
Max Temp Sensor Cnt : 8             Max Voltage Sensor Cnt : 2
============================================================

CU      Status                Fan1Speed      Fan2Speed
============================================================

1       Operational           4735 rpm       4037 rpm
============================================================

ID      Location              Temp Reading
============================================================

1       I/O Module            27C/80F
------------------------------------------------------------

Thermal Management                  : Enabled
Allows to shut down the system when
critical temperature is reached     : Yes
Current minimum fan speed (1-4)     : Level 1
```

```
Controller temperature threshold     : 71C/159F (critical)
                                       61C/141F (warning)
============================================================
ID      Location              Voltage
============================================================
1       I/O Module            4.825V
2       I/O Module            12.360V
------------------------------------------------------------
```

Enclosure Settings List

The Enclosure command enables you to make settings for the enclosure.

- **Enclosure Warning Temperature** – Measured at the backplane. Fan speed increases until temperature falls below the threshold.
- **Enclosure Critical Temperature** – Measured at the backplane. Temperature value for automatic shutdown.
- **Controller Warning Temperature** – Measured inside the I/O module. Fan speed increases until temperature falls below the threshold.
- **Controller Critical Temperature** – Measured inside the I/O module. Temperature value for automatic shutdown.
- **Thermal Management** – Monitors enclosure temperature, adjusts fan speeds, displays red LED on cooling unit when a fan fails
- **Automatic Shutdown** – Shuts down the VessJBOD 30 seconds after the enclosure or controller reaches critical temperature.
- **Minimum Fan Speed** – Specifies the minimum fan speed when the VessJBOD reaches enclosure or controller warning temperature.

Making Enclosure Settings

To set the enclosure warning temperature to 51°C (141°F):

At the cli> prompt, type **enclosure -a mod -s “enc_warning=51”** and press Enter.

Warning temperature range is 10° to 51°C (50° to 123°F)

To set the enclosure critical temperature to 61°C (141°F):

At the cli> prompt, type **enclosure -a mod -s “enc_critical=61”** and press Enter.

Critical temperature range is 51° to 61°C (123° to 141°F)

To set the controller warning temperature to 51°C (141°F):

At the cli> prompt, type **enclosure -a mod -s “ctrl_warning=75”** and press Enter.

Warning temperature range is 10° to 75°C (50° to 172°F)

To set the controller critical temperature to 61°C (141°F):

At the cli> prompt, type **enclosure -a mod -s “ctrl_critical=90”** and press Enter.

Critical temperature range is 75° to 90°C (172° to 194°F)

To enable Thermal Management:

At the cli> prompt, type **enclosure -a mod -s “thermalmanager=1”** and press Enter.

For this command, a **1** enables and a **0** disables.

To enable Automatic Shutdown:

At the cli> prompt, type **enclosure -a mod -s “allowshutdown=1”** and press Enter.

For this command, a **1** enables and a **0** disables.

Caution

Promise recommends that you keep Automatic Shutdown enabled at all times.

To set the minimum fan speed to medium high:

At the cli> prompt, type **enclosure -a mod -s “tminfanspeed=3”** and press Enter.

For this command:

- **1** means low
- **2** means medium-low
- **3** means medium-high
- **4** means high

The actual speed depends on the fan manufacturer.

Factory Default Command

The factory default command enables you to restore factory default settings in the VessJBOD enclosure.

To restore the enclosure to the default settings:

At the cli> prompt, type **factorydefault -a mod -s “default=1”** and press Enter.

When the cli> prompt appears again, all settings have been restored to the default values.

Help Command

The VessJBOD CLI uses the standard Unix online help system.

To access general help:

At the cli> prompt, type **help** and press Enter.

To access help with a specific function:

At the cli> prompt, type **help** followed by the name of the function and press Enter.

Or, at the cli> prompt, type the name of the function followed by **-h** and press Enter.

See “CLI Command Set” on page 22 for a list of supported functions.

Link Command

The Link command displays information about VessJBOD links, including:

- Link Status (page 27)
- Link Statistics (page 28)
- Clearing Statistics (page 30)
- Expander SAS Addresses (page 30)
- Attached SAS Addresses (page 30)

Viewing Link Status

To view link status:

At the cli> prompt, type **link** and press Enter.

The system returns:

```
Link Status:
=====================================================================
Phy      Port    Type    Rate    Init    Dev     Link    PRdy
=====================================================================
 0       DSK01   SAS     3.0G    OK      End     ----    Rdy
 1       DSK02   SAS     3.0G    OK      End     ----    Rdy
 2       DSK03   SAS     3.0G    OK      End     ----    Rdy
 3       DSK04   SAS     3.0G    OK      End     ----    Rdy
 4       DSK05   SAS     3.0G    OK      End     ----    Rdy
 5       DSK06   SAS     3.0G    OK      End     ----    Rdy
 6       DSK07   SAS     3.0G    OK      End     ----    Rdy
 7       DSK08   SAS     3.0G    OK      End     ----    Rdy
```

```
 8       DSK09   SAS     3.0G    OK      End     ----    Rdy
 9       DSK10   SAS     3.0G    OK      End     ----    Rdy
10       DSK11   SAS     3.0G    OK      End     ----    Rdy
11       DSK12   SAS     3.0G    OK      End     ----    Rdy
12       DSK13   SAS     3.0G    OK      End     ----    Rdy
13       DSK14   SAS     3.0G    OK      End     ----    Rdy
14       DSK15   SAS     3.0G    OK      End     ----    Rdy
15       DSK16   SAS     3.0G    OK      End     ----    Rdy
16       CN#1    ----    ----    ----    ----    ----    ----
17       CN#1    ----    ----    ----    ----    ----    ----
18       CN#1    ----    ----    ----    ----    ----    ----
19       CN#1    ----    ----    ----    ----    ----    ----
20       CN#2    SAS     3.0G    OK      End     ----    Rdy
21       CN#2    SAS     3.0G    OK      End     ----    Rdy
22       CN#2    SAS     3.0G    OK      End     ----    Rdy
23       CN#2    SAS     3.0G    OK      End     ----    Rdy
Phy : PHY ID         Port: Port Id       Type: SAS or SATA
Rate: Rate 3G/6G     Init: Init Passed   Dev : Device Type
Link: Link Connected  PRdy: Phy Ready

------------------------------------------------------------------------
```

The following items are reported in the table above:

- **Phy** – Each link is a PHY, numbered 0 through 23
- **Port** – DSK01 through DSK16 represent drive slots. Each slot has one PHY. See “Drive Slot Numbering” on page 9.

  CN#1 is the SAS IN port, circle icon. CN#2 is the SAS OUT port, diamond icon. See page 21, Figure 3. Each port has four PHYs.
- **Type** – Physical drive type, SAS or SATA
- **Rate** – Physical drive data rate, 3.0 Gb/s
- **Dev** – Device type. End means an end device. Exp means an expansion device
- **Link** – Normally, ---- is displayed. If there is a connection at the moment the link command runs, it displays CONN
- **PRdy** – PHY Ready Status. If the port is ready, it displays Rdy

Viewing Link Statistics

To view link status:

1. At the cli> prompt, type **link** and press Enter.
2. Scroll down to Link Statistics.

The screen displays:

```
Link Statistics:
========================================================================
Phy   Type    InDW       DsEr       DwLo       PhRe       CoVi       PhCh
========================================================================
 0    DSK01   -------    -------    -------    -------    -------    0x11
 1    DSK01   -------    -------    -------    -------    -------    0x61
 2    DSK01   -------    -------    -------    -------    -------    0x0D
 3    DSK01   -------    -------    -------    -------    -------    0x0D
 4    DSK01   -------    -------    -------    -------    -------    0x01
 5    DSK01   -------    -------    -------    -------    -------    0x61
 6    DSK01   -------    -------    -------    -------    -------    0x11
 7    DSK01   -------    -------    -------    -------    -------    0x0D
 8    DSK01   -------    -------    -------    -------    -------    0x0D
 9    DSK01   -------    -------    -------    -------    -------    0x01
10    DSK01   -------    -------    -------    -------    -------    0x0D
11    DSK01   -------    -------    -------    -------    -------    0x0D
12    DSK01   -------    -------    -------    -------    -------    0x01
13    DSK01   -------    -------    -------    -------    -------    0x5D
14    DSK01   -------    -------    -------    -------    -------    0x0D
15    DSK01   -------    -------    -------    -------    -------    0x09
16    CN#1    -------    -------    -------    -------    -------    ----
17    CN#1    -------    -------    -------    -------    -------    ----
18    CN#1    -------    -------    -------    -------    -------    ----
19    CN#1    -------    -------    -------    -------    -------    ---
20    CN#2    -------    -------    -------    -------    -------    0x8F
21    CN#2    -------    -------    -------    -------    -------    0x8F
22    CN#2    -------    -------    -------    -------    -------    0x8F
23    CN#2    -------    -------    -------    -------    -------    0x8F
------------------------------------------------------------------------
```

The following items are reported in the table above. All counts are hexadecimal:

- **Phy** – Each link is a PHY, numbered 0 through 23
- **Port** – DSK01 through DSK16 represent drive slots. Each slot has one PHY. See “Drive Slot Numbering” on page 9.

  CN#1 is the SAS IN port, circle icon. CN#2 is the SAS OUT port, diamond icon. See page 21, Figure 3. Each port has four PHYs.

- **InDW** – Invalid D-word Count
- **DsER** – Disparity Error Count
- **DwLo** – Dword Sync Loss Count
- **PhRe** – PHY Reset Problem Count
- **CoVi** – Code Violation Count
- **PhCh** – PHY Change Count

If the count is zero, the counter shows dashes (------).

The fact that errors occur does not necessarily indicate a problem or that the VessJBOD unit is malfunctioning.

An individual error count that increments regularly indicates a possible problem and requires further investigation.

Clearing Statistics

To clear the link error statistics:

At the **cli>** prompt, type **link -a clear** and press Enter.

Viewing SAS Addresses

To view SAS addresses:

1. At the cli> prompt, type **link** and press Enter.
2. Scroll down to Expander SAS Addresses or Attached SAS Addresses.

   The screen displays:

```
Expander SAS Addresses:
============================================================
Type          SAS Address
============================================================
Base          50 00 15 5D 21 12 22 00
SSP           50 00 15 5D 21 12 22 3E
SMP           50 00 15 5D 21 12 22 3F
Attached SAS Addresses:
============================================================
Port          SAS Address
============================================================
DSK01         50 00 15 E0 11 4E 5E B2
DSK02         50 00 15 E0 11 4E 80 C2
DSK03         50 00 15 E0 11 4C 22 02
```

```
DSK04          50 00 15 E0 11 4D E2 22
DSK05          50 00 15 E0 11 4D 8F B2
DSK06          50 00 15 E0 11 4D D0 62
DSK07          50 00 15 E0 11 4D DE E2
DSK08          50 00 15 E0 11 4D 8E F2
DSK09          50 00 15 E0 11 4C 97 62
DSK10          50 00 15 E0 11 4C 36 62
DSK11          50 00 00 E0 11 4F 18 E2
DSK12          50 00 00 E0 11 4F 18 D2
DSK13          50 00 00 E0 11 4D 8E 52
DSK14          50 00 00 E0 11 4D E2 22
DSK15          50 00 00 E0 11 4E 49 C2
DSK16          50 00 00 E0 11 4D DC F2
CN#1           No Device Attached
CN#2           50 00 15 5F FF C0 22 3F
-------------------------------------------------------------
```

The following items are reported in the table above:

- **Port** – DSK01 through DSK16 represent drive slots. Each slot has one PHY. See “Drive Slot Numbering” on page 9.

  CN#1 is the SAS IN port, circle icon. CN#2 is the SAS OUT port, diamond icon. See page 21, Figure 3. Each port has four PHYs.

Route Command

To view the SAS addresses of the devices in your domain:

At the cli> prompt, type **route -a list** and press Enter.

The system returns:

```
Routing Table Mapping:
Entry#         SAS Address               CnID
-------------------------------------------------
0159           500000E0114D8FB2          CN#2
0163           500000E0114C2252          CN#2
0202           500000E0120B3562          CN#2
0238           500000E01212F582          CN#2
0287           500000E0120B26B2          CN#2

0365           5000155FFFC0223E          CN#2
0462           500000E0114F18F2          CN#2
```

```
0468          500000E01205B472          CN#2
0542          500000E01122C5B2          CN#2
0624          500000E0114E4A32          CN#2

0639          500000E0114D8E32          CN#2
0700          500000E0120B2A62          CN#2
0721          500000E0114DE7A2          CN#2
0751          500000E0114E5EA2          CN#2
0764          500000E0120B28F2          CN2

0765          500000E0114C2342          CN#2
0977          500000E0120A2472          CN#2
1023          5000155FFFC02408          CN#2
-------------------------------------------------------------------
```

The route command displays SAS addresses that are attached to the SAS ports of the VessJBOD unit. Three items are reported:

- **Entry#** – Arbitrary numbers, listed in sequence
- **SAS Address** – Of the disk drive or other component
- **CnID** – External SAS port connector

  CN#1 is the SAS IN port, circle icon. CN#2 is the SAS OUT port, diamond icon. See page 21, Figure 3.

Route Troubleshooting

If your system returns:

```
No SAS Routing Entry Exists
```

...it indicates that no downstream devices are found.

Uptime Command

The uptime command informs you of the elapsed period of time since the VessJBOD unit was powered on.

To display uptime:

The I/O module supports cables from 1 to 8 meters in length.The system returns:

```
System has been running 1 day 9 hours 46 minutes 36 seconds
```

VPDR Command

The vpdr command displays vital product data on the major components of the VessJBOD enclosure.

To display vital product data:

At the cli> prompt, type **vpdr -i** and the number of the component, and press Enter.

For this command:

- **1** – Controller (I/O module)
- **6** – Backplane

For example, **vpdr -i 1** returns:

```
Board ID      :0
OEM Name      :PROMISE
OEM Model     :Cx20s-Jbod
Mfg Part      :IOC-C620s-01
Mfg SN        :B17D07138400004
Mfg Rev       :A1R1.0
Mfg Date      :2009:02:15
WWN           :20 00 01 01 55 FF FC 0D
```

? Command

The VTrak CLI uses the standard Unix online help system.

To access help with a specific function:

At the cli> prompt, type **?** followed by the name of the function and press Enter.

Or, at the cli> prompt, type the name of the function followed by **-?** and press Enter.

See “CLI Command Set” on page 22 for a list of supported functions.

Chapter 4: Maintenance

This chapter covers the following topics:

- Updating the Firmware (below)
- Replacing a Power Supply (page 38)
- Replacing an I/O Module (page 39)
- Replacing a Cooling Fan (page 40)

Updating the Firmware

There are two ways to update the VessJBOD's firmware.

- Through a VessRAID subsystem using WebPAM PROe
- With the JBOD Flash Utility

Downloading the Firmware Image File

Go to the Promise website at http://www.promise.com/support/support_eng.asp and download the latest firmware image (.img) file to your Host PC.

Updating Firmware in WebPAM PROe

Warning

Do not restart the VessJBOD during a firmware upgrade procedure. Wait until you see the *Flash image completed* message.

This procedure updates the firmware on all VessJBOD subsystems that appear in the WebPAM PRO interface on the Host PC.

To update the firmware:

1. Click the Subsystem icon.
2. Click the Software Management icon.
3. Click the **Firmware Update** tab.
4. Do one of the following actions:
   - Click the *Download Flash File from TFTP Server* option, then click the **Next** button.
   - Click the *Download Flash File from Local File through HTTP* option, then click the **Next** button.
5. For the TFTP Server option:

- Enter the hostname or IP address of your TFTP server in the field provided.
- Enter the port number of your TFTP server in the field provided (69 is the default).
- Enter the filename of the Firmware Update file in the field provided. The filename is similar to *exp.fw.2.03.0000.00.bin*.
- Click the **Submit** button.

For the Local File option:

- Click the **Browse** button.
- Navigate to the Firmware Update file. The filename is similar to *exp.fw.2.03.0000.00.bin*.
- Click the file, then click the **Open** button.
- Click the **Submit** button.

6. When the download is completed, click the **Next** button.

   A popup message appears warning you not to reboot the VessRAID during the firmware update procedure.

7. In the popup message, click the **OK** button.

   The update progress displays. Then a popup message appears to tell you to reboot the VessRAID.

8. In the popup message, click the **OK** button.
9. Restart the VessRAIDs and VessJBODs:
   - Shut down the VessRAID subsystems. See “Shutting Down the Subsystem” in the *VessRAID Product Manual*.
   - On the VessJBOD subsystems, turn OFF the power supply switches.
   - Wait 30 seconds, then turn ON the VessJBOD power supply switches.
   - Wait 30 additional seconds, then turn ON the VessRAID power supply switches.

   To verify the firmware update, run the enclosure command in the CLI. See page 23.

Note

After you click the **Submit** button, if WebPAM PROe displays this message: *error transferring image*, you entered an incorrect file name or an incorrect location. Check the information and try again.

Updating Firmware with the JBOD Flash Utility

Warning

Do not restart the VessJBOD during a firmware upgrade procedure. Wait until you see the *Firmware download finished successfully* message.

The download firmware image (.img) file package includes a Windows-based utility to update the firmware on the VessJBOD. The JBOD utility:

- Updates firmware on VessJBOD subsystems only
- Updates one VessJBOD at a time
- Runs on Windows PCs over a RS232 serial connection
- Works with any RAID system configuration

Preparing the Utility

To prepare the utility:

1. Verify that your serial connection from your PC to the VessJBOD is online.

   See “Setting up the Serial Connection” on page 18.

2. Unzip the firmware download, locate and open the *expfwdlutil* folder.

   The utility file is **expfwdlutil_<version number>.exe**.

   By default, the utility connects to the VessJBOD through the Host PC’s COM1 port.

If you are using a different COM port, you must change the port setting in the configuration file.

To access the configuration file and change the COM port setting:

1. Double click the **expfwdlutil_<version number>.exe** file to start the utility.
2. In the Flash Utility dialog box, click the **Quit** button. In the Warning box, click the **Yes** button.

   When the utility opened, it created a **fwdl.ini** file in the same directory.
3. Open the **fwdl.ini** configuration file in a text editor and change the *comport* number as required.

   ```
   [settings]
   file=
   comport=1
   ```

   The *file* value fills in automatically when you run the utility.

   Save and close the **fwdl.ini** file.

Updating the Firmware

To update the firmware:

1. Double click the **expfwdlutil_<version number>.exe** file.

   The Flash Utility dialog box appears.
2. Click the **Browse** button and navigate to the Firmware Update file in the *firmware* folder.

   The firmware file is **exp.fw.<version number>.bin**.
3. Click the file, then click the **Open** button.
4. Click the **Start** button.

   The update begins. You can monitor progress on the Progress bar. The operation takes about four minutes.
5. When you see the message:

   Firmware download finished successfully.
   Please power cycle the system for the new firmware to take effect.

   Click the **Quit** button. In the Warning box, click the **Yes** button.
6. Restart the VessJBOD:
   - Turn OFF the power supply switch (switches).
   - Wait 30 seconds, then turn ON the power supply switch (switches).

   To verify the firmware update, run the enclosure command in the CLI. See page 23.

Replacing a Power Supply

VessJBOD 1740

The power supply on the VessJBOD 1740 is not replaceable onsite. If you need to replace the power supply, contact Technical Support and make arrangements to return the subsystem to Promise for service. See page 44.

VessJBOD 1840

The redundant power supplies on the VessJBOD 1840 are designed as field-replaceable units. You can replace a power supply without removing the VessJBOD from the rack.

Removing the old power supply

To remove the power supply:

1. Verify that the power supply LED is amber or red.
2. Switch off the power to the power supply you plan to replace.

3. Unplug the power cord.
4. Loosen and remove the retaining screw on the left side of the power supply.
5. Pull the power supply out of the VessRAID enclosure.

Installing the new power supply

To install the power supply:

1. Carefully slide the power supply into the enclosure.
2. Install and tighten the retaining screw on the left side of the power supply.
3. Plug in the power cord.
4. Switch on the power supply.
5. Verify that the new power supply LED is green.

This completes the power supply replacement procedure.

Replacing an I/O Module

The I/O module monitors and manages the logical drives. When the I/O module is replaced, all of your logical drive data and configurations remain intact because this logical drive information is stored on the disk drives.

I/O module failure is rare. But you might have to remove and reinstall the same I/O module in order to replace a cooling fan as described in this chapter.

Caution

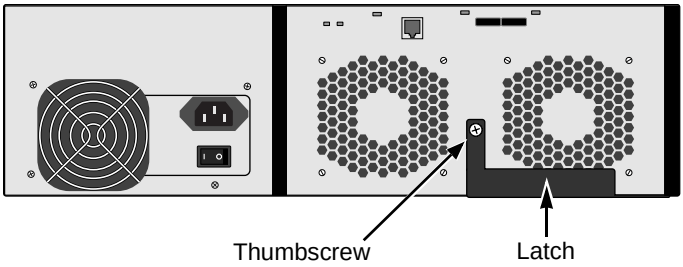
- Do not replace the I/O module based on LED colors alone. Only replace the I/O module when directed to do so by Promise Technical Support. See page 44.
- Only a qualified technician should perform this procedure.
- You must shut down the VessJBOD subsystem before you can perform this procedure.

Removing the old I/O module

To replace the I/O module:

1. Shut down the VessJBOD. Turn OFF the power supply switch (switches).
2. Disconnect the SAS, serial, and power cables.
3. On the I/O module, loosen the thumbscrew, swing the latch to the right and pull the I/O module out of the enclosure. See Figure 1.

Figure 1. Removing the I/O module



Installing the new I/O module

1. Carefully slide the new I/O module into the enclosure.
2. Swing the latch to the left and secure it with the thumbscrew.
3. Reconnect the SAS, serial, and power cables.
4. Switch on the power. Turn ON the power supply switch (switches).

   The VessJBOD restarts. For more information about VessJBOD's start-up behavior, see "Connecting the Power" on page 16.

This completes the I/O module replacement procedure.

Replacing a Cooling Fan

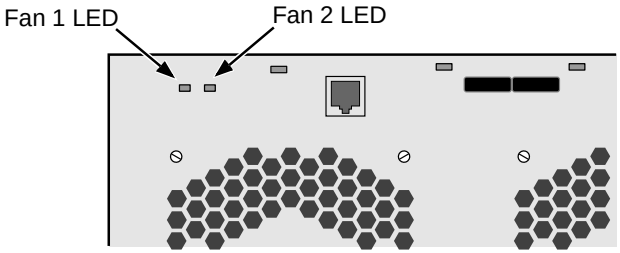
Cautions

- Only a qualified technician should perform this procedure.
- You must shut down the VessJBOD subsystem before you can perform this procedure.

To replace a fan:

1. Verify that the Fan LED on the cooling unit is amber or red. See Figure 2.

Figure 2. Fan LEDs

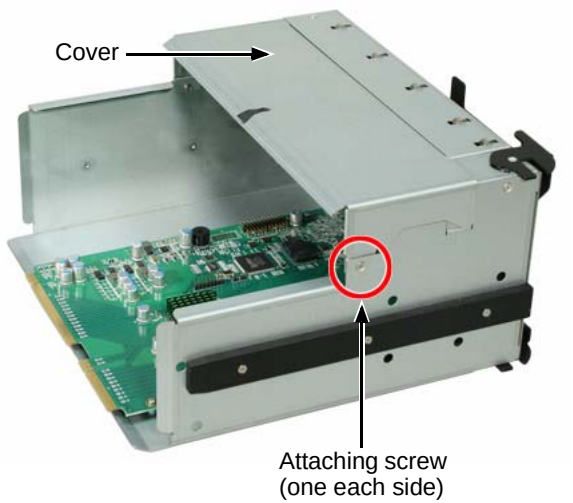


2. Shut down the VessJBOD and remove the I/O module.

   See “Replacing an I/O Module” on page 39.

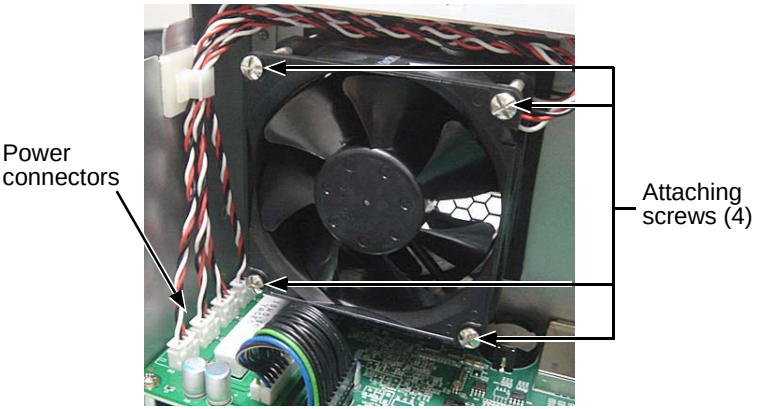
3. Lay the I/O module on a non-static surface and remove the cover attaching screws, one on each side, then remove the cover.

Figure 3. I/O module cover and attaching screw



4. Remove the four attaching screws. See Figure 4.
5. Detach the fan’s power connector and lift the old fan out of the I/O module.

Figure 4. I/O module cooling fan



6. Place a new fan in the I/O module, attach the power connector, and install the four attaching screws.
7. Attach the I/O module cover and install the two attaching screws.

   See Figure 3.
8. Reinstall the I/O module.

   See “Replacing an I/O Module” on page 39.

This completes the fan replacement procedure.

Chapter 5: Support

This chapter covers the following topics:

- Frequently Asked Questions (below)
- Contacting Technical Support (page 44)
- Limited Warranty (page 47)
- Returning the Product For Repair (page 49)

Frequently Asked Questions

What kind of disk drives can I use with VessJBOD?

The VessJBOD supports 3.0 GB/s Serial ATA disk drives and 3.0 Gb/s SAS drives.

VessJBOD does not support Parallel ATA (PATA) disk drives.

Can I take the disk drives from my Promise VTrak, put them into the VessJBOD, and keep my disk array or logical drive intact?

Yes. Like VessJBOD, the newer VTrak subsystems use the industry-standard DDF method of disk metadata, stored in the reserve sector of each physical drive. Use the Transport function to prepare your disk drives before moving them. See “Preparing the Disk Array for Transport” in the *VessRAID Product Manual*.

Early VTrak subsystems used a proprietary method of disk metadata. VessRAID subsystems have a metadata-to-DDF conversion feature that converts disk drives in attached VessJBOD enclosures. To use the conversion feature, you must restart the VessRAID and VessJBOD after installing disk drives from an older VTrak subsystem.

Note that if you move your disk drives from the VessJBOD to an early VTrak, the older subsystem will not recognize your disk array or logical drive.

How can I tell when the VessJBOD has fully booted?

When the VessJBOD unit is fully booted up, the Power and FRU LEDs will light up green. The heartbeat LED blinks green once a second.

What happens if a disk drive fails?

Depending on the nature of the failure, the failed drive the drive might not appear in the CLI—or the failed drive might appear with some errors—when you run the **link** command. See page 27.

Can I hot-swap a failed drive with a new one?

Yes. Disk drives are hot-swappable on the VessJBOD.

Can a VessJBOD 1840 run using just one power supply?

Yes, it is possible to run the VessJBOD 1840 on a single power supply. There are two power supplies so that the 1840 will continue running if one of the power supply fails. But deliberately leaving one power supply off negates this advantage.

In addition, leaving one power supply off reduces air flow through the VessRAID enclosure and can contribute to overheating. Always switch on both power supplies.

Contacting Technical Support

Promise Technical Support provides several support options for Promise users to access information and updates. We encourage you to use one of our electronic services, which provide product information updates for the most efficient service and support.

If you decide to contact us, please have the following information available:

- Product model and serial number
- BIOS, firmware, and driver version numbers
- A description of the problem / situation
- System configuration information, including: motherboard and CPU type, hard drive model(s), SAS/SATA/ATA/ATAPI drives & devices, and other controllers.

Technical Support Services

Promise Online™ Web Site	http://www.promise.com/support/support_eng.asp (technical documents, drivers, utilities, etc.)

United States

E-mail Support	e-Support On-Line
Fax Support	+1 408 228 1100 Attn: Technical Support
Phone Support	+1 408 228 1400 option 4
If you wish to write us for support:	Promise Technology, Inc. 580 Cottonwood Drive Milpitas, CA 95035, USA

The Netherlands

E-mail Support	e-Support On-Line
Fax Support	+31 0 40 256 9463 Attn: Technical Support
Phone Support	+31 0 40 235 2600
If you wish to write us for support:	Promise Technology Europe B.V. Science Park Eindhoven 5542 5692 EL Son, The Netherlands

Germany

E-mail Support	e-Support On-Line
Fax Technical Support	+49 0 2 31 56 76 48 29 Attn: Technical Support
Phone Technical Support	+49 0 2 31 56 76 48 10
If you wish to write us for support:	Promise Technology Germany Europaplatz 9 44269 Dortmund, Germany

Italy

E-mail Support	e-Support On-Line
Fax Support	+39 0 6 367 124 00 Attn: Technical Support
Phone Support	+39 0 6 367 126 26
If you wish to write us for support:	Promise Technology Italy Piazza del Popolo 18 00187 Roma, Italia

Taiwan

E-mail Support	e-Support On-Line
Fax Support	+886 3 578 2390 Attn: Technical Support
Phone Support	+886 3 578 2395 ext. 8822 or 8823
If you wish to write us for support:	Promise Technology, Inc. 2F, No. 30, Industry E. Rd. IX Science-based Industrial Park Hsin-Chu 30075, Taiwan (R.O.C.)

China

E-mail Support	e-Support On-Line
Fax Support	+86 10 8857 8015 Attn: Technical Support
Phone Support	+86 10 8857 8085 or 8095
If you wish to write us for support:	Promise Technology China – Beijing Room 1205, Tower C Webok Time Center, No.17 South Zhong Guan Cun Street Hai Dian District, Beijing 100081, China
E-mail Support	e-Support On-Line
Fax Support	+86 21 6249 4627 Attn: Technical Support
Phone Support	+86 21 6249 4192, 4193, or 4199
If you wish to write us for support:	Promise Technology China – Shanghai Room 508, Leader Tower 1189 West Wu Ding Road Jing An District, Shanghai 200042, China

Limited Warranty

Promise Technology, Inc. (“Promise”) warrants that this product, from the time of the delivery of the product to the original end user:

a) all components for a period of three (3) years;

b) will conform to Promise’s specifications;

c) will be free from defects in material and workmanship under normal use and service.

This warranty:

a) applies only to products which are new and in cartons on the date of purchase;

b) is not transferable;

c) is valid only when accompanied by a copy of the original purchase invoice.

d) Is not valid on spare parts.

This warranty shall not apply to defects resulting from:

a) improper or inadequate maintenance, or unauthorized modification(s), performed by the end user;

b) operation outside the environmental specifications for the product;

c) accident, misuse, negligence, misapplication, abuse, natural or personal disaster, or maintenance by anyone other than a Promise or a Promise-authorized service center.

Disclaimer of other warranties

This warranty covers only parts and labor, and excludes coverage on software items as expressly set above.

Except as expressly set forth above, Promise DISCLAIMS any warranties, expressed or implied, by statute or otherwise, regarding the product, including, without limitation, any warranties for fitness for any purpose, quality, merchantability, non-infringement, or otherwise. Promise makes no warranty or representation concerning the suitability of any product for use with any other item. You assume full responsibility for selecting products and for ensuring that the products selected are compatible and appropriate for use with other goods with which they will be used.

Promise DOES NOT WARRANT that any product is free from errors or that it will interface without problems with your computer system. It is your responsibility to

back up or otherwise save important data before installing any product and continue to back up your important data regularly.

No other document, statement or representation may be relied on to vary the terms of this limited warranty.

Promise's sole responsibility with respect to any product is to do one of the following:

a) replace the product with a conforming unit of the same or superior product;

b) repair the product.

Promise shall not be liable for the cost of procuring substitute goods, services, lost profits, unrealized savings, equipment damage, costs of recovering, reprogramming, or reproducing of programs or data stored in or used with the products, or for any other general, special, consequential, indirect, incidental, or punitive damages, whether in contract, tort, or otherwise, notwithstanding the failure of the essential purpose of the foregoing remedy and regardless of whether Promise has been advised of the possibility of such damages. Promise is not an insurer. If you desire insurance against such damage, you must obtain insurance from another party.

Some states do not allow the exclusion or limitation of incidental or consequential damages for consumer products, so the above limitation may not apply to you.

This warranty gives specific legal rights, and you may also have other rights that vary from state to state. This limited warranty is governed by the State of California.

Your Responsibilities

You are responsible for determining whether the product is appropriate for your use and will interface with your equipment without malfunction or damage. You are also responsible for backing up your data before installing any product and for regularly backing up your data after installing the product. Promise is not liable for any damage to equipment or data loss resulting from the use of any product.

Returning the Product For Repair

If you suspect a product is not working properly, or if you have any questions about your product, contact our Technical Support Staff through one of our Technical Services, making sure to provide the following information:

- Product model and serial number (required)
- Return shipping address
- Daytime phone number
- Description of the problem
- Copy of the original purchase invoice

The technician will assist you in determining whether the product requires repair. If the product needs repair, the Technical Support Department will issue an RMA (Return Merchandise Authorization) number.

Important

Obtain an RMA number from Technical Support *before* you return the product and write the RMA number on the label. The RMA number is essential for tracking your product and providing the proper service.

Return ONLY the specific product covered by the warranty (do not ship cables, manuals, diskettes, etc.), with a copy of your proof of purchase to:

USA and Canada:	Promise Technology, Inc. Customer Service Dept. Attn.: RMA # _____ 47654 Kato Road Fremont, CA 94538
Other Countries:	Return the product to your dealer or retailer. Contact them for instructions before shipping the product.

You must follow the packaging guidelines for returning products:

- Use the original shipping carton and packaging
- Include a summary of the product's problem(s)
- Write an attention line on the box with the RMA number
- Include a copy of proof of purchase

You are responsible for the cost of insurance and shipment of the product to Promise. Note that damage incurred due to improper transport or packaging is not covered under the Limited Warranty.

When repairing returned product(s), Promise may replace defective parts with new or reconditioned parts, or replace the entire unit with a new or reconditioned unit. In the event of a replacement, the replacement unit will be under warranty for the remainder of the original warranty term from purchase date, or 30 days, whichever is longer.

Promise will pay for standard return shipping charges only. You will be required to pay for any additional shipping options (such as express shipping).

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